UNITED STATES SIGNAL SERVICE

MONTHLY WEATHER REVIEW.

VOL. XVIII. WASHINGTON CITY, AUGUST, 1890. No. 8.

INTRODUCTION.

This REVIEW is based on reports for August, 1890, from 2,340 regular and voluntary observers. These reports are classified as follows: 168 reports from Signal Service stations; 121 reports from United States Army post surgeons; 5 reports of rainfall observations of the United States Geological Survey in Arizona and New Mexico; 1,498 monthly reports from state weather service and voluntary observers; 26 reports from Canadian stations; 151 reports through the Central Pacific Railway Company; 371 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa Weather and Crop Service, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Meteorological Report of the Missouri State Board of Agriculture, Nebraska, Nevada, New England, New Jersey, New York, North and South Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, and Texas, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

CHARACTERISTICS OF THE WEATHER FOR AUGUST, 1890.

An important feature of the month was the West India cyclone which moved from east of the Windward Islands to northwest of Bermuda from the 27th to 31st, with winds of hurricane force and loss of life and shipping.

In the west part of the upper lake region and the upper part of the Mississippi Valley the month was the coldest, and at stations on the middle California coast and in the lower Rio Grande valley it was the warmest August on record. The greatest departures below the average temperature for August were noted in the upper Mississippi valley and thence northward to the British Possessions, where they exceeded 3°, and the greatest departures above the average occurred at Sydney, C. B. I., and San Francisco, Cal., where they exceeded 2°. The highest temperature reported by a regular station of the Signal Service was 110° at Yuma, Ariz., and by a voluntary observer 120° at Volcano Springs, Cal. The lowest temperature reported by a regular station of the Signal Service was 30° at Saint Vincent, Minn., and by a voluntary observer 24° at Alma, Colo., and Bonanza, Idaho. Killing frost occurred on the 16th in Saint Lawrence Co., N. Y.; on the 22d at Saint Vincent, Minn., and Saint Lawrence, S. Dak.; on the 23d at Manton, Mich.; and on the 24th at Alpena, Mich. The frost of the 16th in Saint Lawrence Co., N. Y., was about one month earlier; that of the 22d at Saint Vincent, Minn., was about 10 days earlier; that of the 22d at Saint Lawrence, S. Dak., was about two weeks earlier; and that of the 23d at Manton, Mich., and of the 24th at Alpena, Mich., was about one week earlier than the average date of first killing frost in the respective localities.

The rainfall was unevenly distributed over the interior and eastern parts of the country, and large excesses and marked deficiencies occurred in limited and irregularly distributed areas. The greatest excess occurred in west-central Arkansas, where it exceeded 8.00 inches at Fort Smith, nine years record. In the middle Saint Lawrence valley the excess above the average for August was more than 5.00 inches at Montreal, and more than 4.00 inches at Quebec, and on the south-central coast of Nova Scotia, on the immediate Atlantic coast from Norfolk, Va., to Atlantic City, N. J., and in the Mississippi Valley from Vicksburg, Miss., to Cairo, Ill., it was more than 3.00. The greatest deficiency occurred on the Georgia and east-central and extreme west Florida coasts, where it was more than 4.00 inches, and the deficiency exceeded 2.00 inches at stations on the south New England coast, along the south Atlantic and Florida coasts, and in the lower Rio Grande, upper Mississippi, and Missouri valleys. At stations in New Hampshire and Vermont, at Statesburgh, S. C., in west-central Arkansas, east-central Colorado, and in the south and west parts of the southern plateau the rainfall was the heaviest ever reported for August. On the north Pacific coast the rainfall was about one-half greater, and in the Ohio Valley and Tennessee, the southern plateau, and the middle Atlantic states it was one-fourth to one-half greater than the average; while on the south Pacific coast about one-fifth, in the Rio Grande Valley about one-fourth, and at Key West, Fla., in the northern plateau, the Missouri Valley, extreme northwest, and in the south Atlantic states two-fourths to three-fourths of the usual amount of rainfall was reported. Light snow flurries were reported along the upper Saint Marie River, Mich., on the 9th, and in Dauphin, Northampton, and Northumberland counties, Pennsylvania, on the 23d.

Destructive storms were reported in Kentucky on the 1st; in North Carolina, Virginia, and Iowa on the 2d; in Iowa, southern Minnesota, South Dakota, central and east-central Wisconsin, Michigan, Indiana, and New York on the 3d; in Michigan and Arizona on the 4th; in southern California and New Brunswick on the 5th; in Iowa on the 6th; in Minnesota and Arizona on the 7th; in Michigan, Wisconsin, and Florida on the 8th; in Tennessee on the 9th; over Long Island Sound, and in New Jersey, New York, and South Dakota on the 10th; in east-central Colorado on the 14th; in Missouri on the 16th; and in Ohio on the 17th. On the 19th a destructive tornado occurred at Wilkes Barre, Pa., killing sixteen persons, and destroying property to the value of about $600,000. Destructive storms occurred in central Texas on the 20th; and in Maryland, Pennsylvania, and New York on the 21st. A storm presenting the characteristics of a tornado of limited energy occurred near Hiram, Ohio, on the 21st. Destructive storms occurred in Kentucky, Tennessee, Ohio, West Virginia, and western Pennsylvania on the 26th; in Michigan on the 28th;

and in Idaho on the 29th. Water-spouts were observed at Key West, Fla., on the 20th, and at Galveston, Tex., on the 30th.

The Arkansas River fell to zero on the gauge at Fort Smith, Ark., on the 12th; this was the lowest stage of water at that place since 1856. The Gila River, Arizona, was high about one-third of the month, and considerable damage was caused by flood. The drought which prevailed in Kansas, Nebraska, South Dakota, Iowa, northern Texas, Indian Territory, Minnesota, and parts of the upper lake region, and the Ohio valley and Tennessee was generally broken by rain in the early part of the month. Noteworthy auroral displays were reported at Saint Andrews, N. B., on the 14th; at Green Mountain, Me., on the 14–15th, and 18th; at Sault de Ste. Marie, Mich., on the 17–18th, and 19th; and at Saint Vincent, Minn., 19–20th.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for August, 1890, as determined from observations taken daily at 8 a. m. and 8. p. m. (75th meridian time), is shown on chart II by isobars. The departure of the mean pressure for August, 1890, obtained from observations taken twice daily at the hours named, from that determined from hourly observations, varied at the stations named below, as follows:

Station.	Departure.	Station.	Departure.
Eastport, Me	+.008	Duluth, Minn	—.005
Boston, Mass	+.010	Saint Louis, Mo	—.006
New York City	+.001	New Orleans, La	—.001
Philadelphia, Pa	+.008	Galveston, Tex	—.010
Washington City	+.010	Santa Fé, N. Mex	—.012
Savannah, Ga	+.007	Denver, Colo	—.007
Buffalo, N. Y	+.007	Fort Assinniboine, Mont	—.008
Detroit, Mich	+.004	Salt Lake City, Utah	—.013
Cincinnati, Ohio	+.006	Portland, Oregon	—.012
Chicago, Ill	.000	San Francisco, Cal	—.016
Saint Paul, Minn	—.003	San Diego, Cal	—.016

The mean pressure was highest from eastern Tenn. to the Atlantic coast between the 30th and 35th parallels, where it was above 30.10, and the mean pressure was lowest over the southwest part of the plateau region, where it was below 29.85. From the middle and lower Mississippi valleys eastward to the Atlantic coast and on the immediate north Pacific coast the mean pressure was above 30.05, and in the British Possessions north of N. Dak. and Mont. the mean readings were below 29.90.

A comparison of the pressure chart for August with that of the preceding month shows that there was an increase in mean pressure, save on the Pacific coast north of the 35th parallel, on the Atlantic coast from southern N. J. to N. S., and over southern Fla. The greatest increase in mean pressure occurred from the upper lake region and the west part of the Ohio Valley westward over the southern and the east parts of the middle and northern plateau regions, where it was more than .05. In sections where there was a decrease in mean pressure the changes were less than .05.

The mean pressure was generally above the normal over the entire country. In the Dakotas, Manitoba, northern Ontario, and at stations in the middle Atlantic states and New England the mean pressure was normal or slightly below. The greatest departures above the normal pressure occurred in the south Atlantic and east Gulf states and thence northward to the southern part of the upper lake region, and in the middle plateau region, where they equalled or exceeded .05.

The monthly barometric ranges at the several Signal Service stations are shown in the table of Signal Service data on the last two pages of the REVIEW.

HIGH PRESSURE AREAS.

During the past month the paths of 9 Highs could be traced within the United States for a period of at least 48 hours. 6 of these originated over the Pacific and the other 3 beyond the limits of the map in N. W. T. The paths of these Highs were markedly in high latitudes, only 1, VIII, reaching as far south as 35°, where it lost its identity. The permanent High of the Sargossa Sea seems to have moved slightly west and north of its position in July, and, in consequence, the motion of these Highs tended either to the north or else they gradually spread out and lost their identity as they approached the Atlantic coast. It should be noted that in determining the velocity of Highs it is often difficult to fix upon the exact starting point, as there frequently seems to be a condition favorable to this formation for several days in one locality before there is any definite movement. There also seems to be a transference of the High from one point to another without a definite motion, this is especially noticeable in the plateau regions. There will be found, at the end of this description, a table which gives the principal points regarding these Highs, and the following details are added:

I.—On the first of the month a High of very slight magnitude was central over Lake Michigan. It was noted on the Pacific coast on July 30th, and seems to have moved or progressed from the Pacific coast at a great velocity. On the succeeding days it was partly merged in the Atlantic High, and all trace was lost on the 2d. One inch of rain fell in the "Col" between this High and another to the south in the 12 hours ending 8 p. m. of the 1st.

II.—Was noted off the Pacific coast p. m. of the 2d. Its path curved south on the 3d, through southern Indiana on the 6th; recurving it passed off the Nova Scotia coast on the 8th. The lowest temperature was 44° at Fort Assinniboine, Mont., a. m. of the 3d, and the highest pressure 30.28 at Rockliffe, Ont., a. m. of 7th.

III.—For several days previous to the 6th the pressure had been rising off the north Pacific coast. The isobars and wind directions a. m. of 7th show this High as an offshoot of the Pacific high just to the northwest of Oregon. This was transferred to Montana during the next 12 hours and remained stationary there till 8th a. m. From this point the course was nearly due east, passing off the Nova Scotia coast a. m. 13th. There was a marked oscillation in the pressure from a. m. to p. m. during its passage, as was noted in many other cases also. The following table gives the area covered by the 30.20 isobar a. m. and p. m. during its progress:

Area of isobar of 30.20.

Date.	Square miles.		Date.	Square miles.	
	A. M.	P. M.		A. M.	P. M.
8	20,000	0	11	300,000	10,000
9	60,000	0	12	400,000	0
10	200,000	0	13	100,000	0

IV.—Originated exactly like III off the Pacific coast, and its path followed the same direction, except that as it approached the Atlantic it had a motion to the southeast, as the permanent High there had apparently moved eastward. In consequence this moved off the coast of Connecticut on 16th. The severe frosts in New York occurred in connection with this High 16th a. m.

V.—Was first noted at Edmonton, N. W. T., 15th. Its motion was rather slow at first, reaching Saint Vincent, Minn., in two days and giving the first frost of the season at that point. It had a motion nearly due east and passed off the Nova Scotia coast 19th a. m.

VI.—Originated off the coast of Oregon a. m. of 17th and it was transferred from there to Montana p. m. of the same day. Its motion had a slight bend to the southward, but its general motion was east. It passed off the Nova Scotia coast on 21st. Rains were quite frequent near the centre.